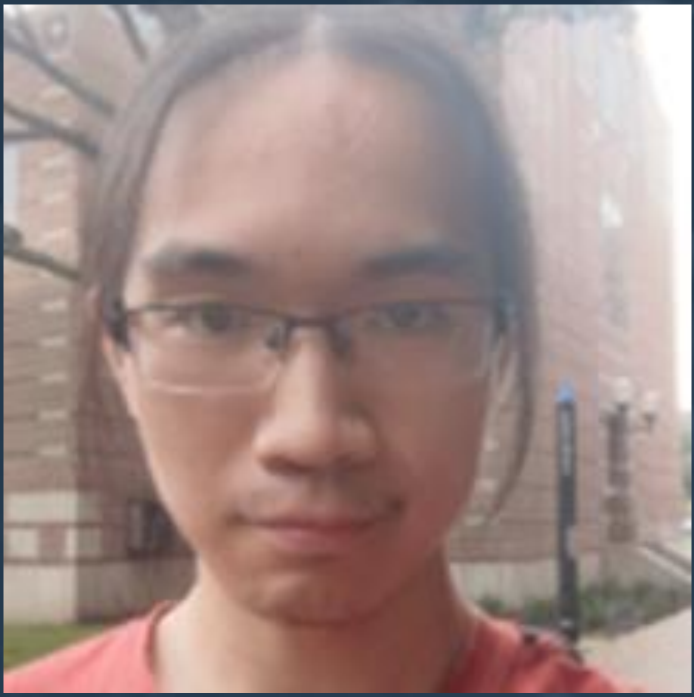
RICE QUANTUM GROUP MEETING SEMINAR SERIES

Ultra Long-range Rydberg Molecule Spectroscopy and Non-local Spatial Correlation Functions in Interacting Gas



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Chuanyu Wang is a graduate student working in Dr. Killian's group. His research interest includes Rydberg atom, Rydberg molecule, and Quantum simulation.

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SST 300

ABSTRACT

Ultra long-range Rydberg molecules (ULRRMs) are molecules formed via a pseudo-potential resulted from the electron-atom scattering between a Rydberg atom and ground state atom(s). The ULRRM dimers vibrational ground state formed at ns S Rydberg state have highly localized internuclear separations, making it a probe of non-local spatial correlation function $g^{(2)}(r)$ in its parent many-body system. Here we discuss spectroscopy studies of the rotational excitation of such dimers excited in ultracold atomic gases of strontium. Various physical processes' effect on the rotational excitation of the molecule during its excitation, like the atom-atom scattering and photon momentum transfer, were studied in detail for ^{84}Sr and ^{86}Sr gases. And we report measurement of $g^{(2)}(r)$ in interacting ultracold ^{86}Sr gas via the excitation rate of vibrational-ground state ULRRM dimers.

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